

UltraSail Solar Sail Flight Experiment, Phase II

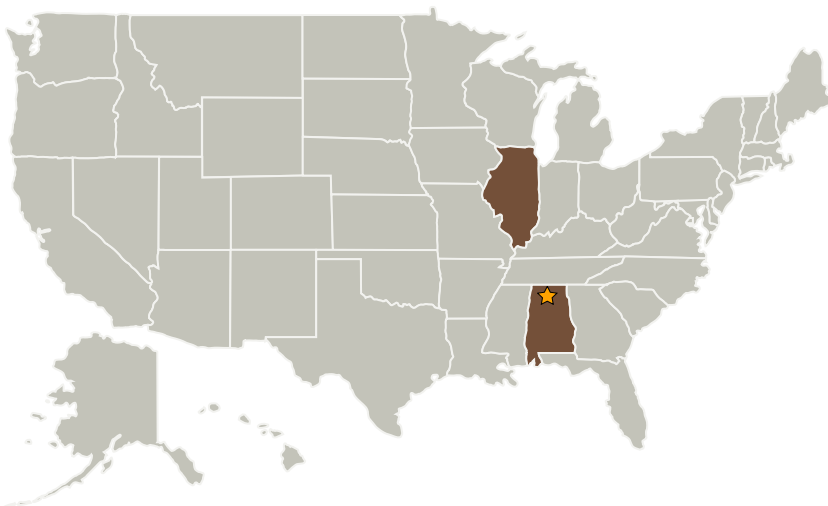
Completed Technology Project (2008 - 2011)



Project Introduction

A team of CU Aerospace, the University of Illinois, and ManTech SRS Technologies proposes Phase II development of a 3 kg CubeSat spacecraft for initial flight test of a 20 m² UltraSail, a next-generation high-risk, high-payoff solar sail system for the launch, deployment, stabilization and control of very large (km² class) solar sails, enabling very high payload mass fractions for interplanetary and deep space spacecraft. UltraSail is an innovative, non-traditional approach to propulsion technology achieved by combining propulsion and control systems developed for formation-flying microsattelites with an innovative solar sail architecture to achieve controllable sail areas approaching 1 km², sail subsystem area densities less than 5 g/m², and thrust levels many times those of ion thrusters used for comparable deep space missions. The primary innovation presented in Phase I was vacuum demonstration plus analysis of two modes of sail deployment. The Phase II effort will include fabrication of dual 1.5 kg CubeSats, vacuum and dynamic testing of the separation release unit, and simulation of spacecraft deployment to full film length, analysis of spacecraft dynamics and environmental effects, and formulation and analysis of mission objectives and groundstation requirements.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Marshall Space Flight Center (MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
CU Aerospace, LLC	Supporting Organization	Industry	Champaign, Illinois

Primary U.S. Work Locations	
Alabama	Illinois

Project Transitions

**December 2008:** Project Start**September 2011:** Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.4 Advanced Propulsion
 - └ TX01.4.1 Solar Sails